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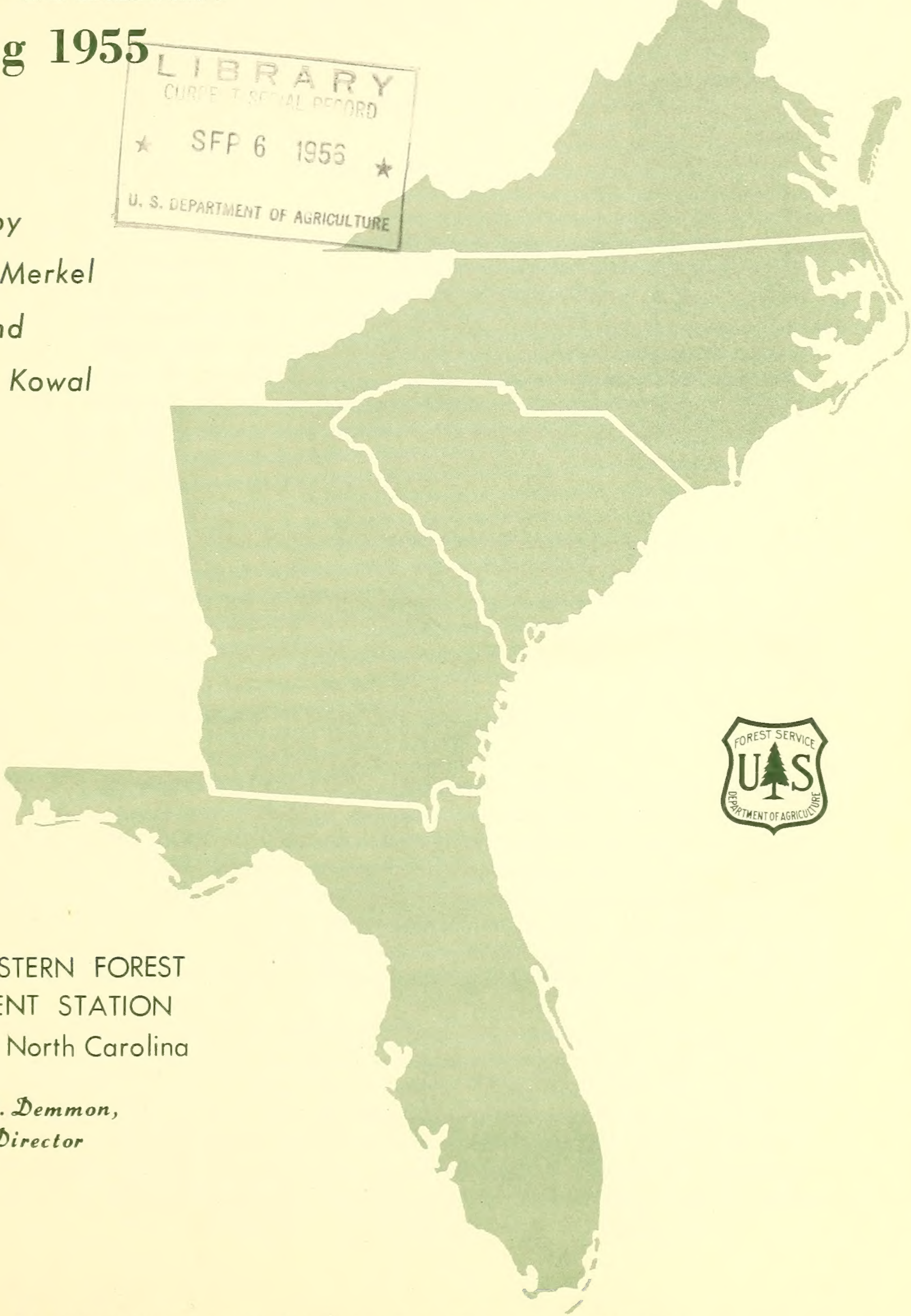

SOUTHEASTERN FOREST
EXPERIMENT STATION
Asheville, North Carolina

E. L. Demmon,
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U. S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE

FOREST INSECT CONDITIONS IN THE SOUTHEAST DURING 1955

by

E. P. Merkel and R. J. Kowal

INTRODUCTION

The southern pine beetle continued its destruction during 1955 in western North Carolina and eastern Tennessee, though at a lower level than in 1954. It was discovered for the first time in the northern counties of South Carolina and Georgia. Ips engraver beetles, attracted by the fire-ravaged woodlands of south Georgia, added their own destruction to the already staggering losses. It hit in other areas too, particularly in south-central North Carolina and north-central South Carolina. It was also active in north Florida. Throughout the Southeast, but particularly in south Georgia and north Florida, the black turpentine beetle continued its destructive activities, building up populations especially in fire-damaged areas.

Planting programs also suffered from insects; the pales weevil, associated weevils, white grubs, and tip moths were particularly damaging. Other insects not so conspicuous as the bark beetles have caused losses which, in the aggregate, are very substantial. There are, however, numerous encouraging signs in the forest insect situation.

PROGRESS IN FOREST ENTOMOLOGY

With the enlargement of the Station's Division of Forest Insect Research, the forest insect survey program in the Southeast became considerably more effective than at any time previously. The program's basic purpose is to develop in foresters and forest landowners a knowledge and consciousness of forest insect pests, which in turn will result in early detection of insect outbreaks. This is intended, insofar as possible, to prevent the development of forest insect epidemics. Its purpose too, is to stimulate interest in the entire field, so that losses may be reduced and forest insect research increased.

Information.--Numerous meetings were held throughout the Southeast to inform foresters about forest insects. Discussions were illustrated with colored slides and specimen mounts. In many cases field demonstrations were held. This type of information was presented to undergraduate forestry students and to forestry graduates attending short courses and meetings. Similar programs have been presented to civic clubs and other organizations to acquaint them with our activities as much as with the forest insect problems.

Forest Insect and Disease Newsletter.--During this year, the Division began to issue a newsletter to keep foresters informed of forest insect activities and the measures they should apply to prevent or control the insects. It is issued whenever the forest pest situation demands it.

Forest Pest Committees.--The formation of such committees has been encouraged as an aid to stimulate action of individuals and organizations in the detection and control of forest pests. The Georgia Forest Pest Committee was formed this year to deal with Georgia's problems. A Southern Pine Beetle Committee has been formed to coordinate efforts and information in connection with the beetle problem in western North Carolina and eastern Tennessee. Separate State Pest Committees in both of these states are now under consideration.

Employment of entomologists by states and industry.--A few years ago, Virginia and North Carolina employed specialists to handle their insect and disease problems. Since then, agencies in Georgia have financed the employment of a forest entomologist and very recently the State of Tennessee employed an entomologist. About a year ago Union Bag and Paper Corporation set a precedent by being the first southern industry to employ a forest entomologist, and Bowaters Southern Paper Corporation has just employed a man to fill a similar position. Indications are that other states and industries are considering similar action.

At present the function of these specialists is to give their attention to critical problems which have built up over the years. However, when these problems are gradually brought under control the efforts of these men will be guided toward survey and research programs to develop methods of growing timber without the ever-present threat of insect attack.

STATUS OF DESTRUCTIVE FOREST INSECTS IN 1955

Southern Pine Beetle

It is estimated that 15.5 million board-feet of pine sawtimber and 42,100 cords of pole timber were killed (table 1) by the southern pine beetle, *Dendroctonus frontalis* Zimm., from central and western Virginia through the Southern Appalachians and Blue Ridge Mountains into northern Georgia and South Carolina in 1955. This figure does not include losses incurred in Kentucky, where the insect has been active during the past 4 years.

North Carolina and Tennessee.--During 1955 in North Carolina and Tennessee a total of 179,700 trees were killed on lands where control operations were in progress. No figure is available for losses on noncontrol lands, which primarily included small private ownership. Of these trees, 136,600 were on the Cherokee and North Carolina National Forests; 61,900 were salvaged and 74,700 were felled and sprayed with $\frac{1}{4}$ percent gamma BHC in fuel oil. About 16,900 infested trees in the Great Smoky Mountains National Park, Cherokee Indian Reservation, and Blue Ridge Parkway (N.C.) were sprayed.

Table 1.--Volume of pine timber killed by major bark beetles in the Southeast[1]
1952-1955

Year[2]	Southern Pine Beetle		Ips Engraver Beetle		Black Turpentine Beetle	
	Pole timber	Saw-timber	Pole timber	Saw-timber	Pole timber	Saw-timber
	Thousand cords	Million bd. ft.	Thousand cords	Million bd. ft.	Thousand cords	Million bd. ft.
1952	14.2	5.4	129.4	103.3	7.8	8.5
1953	21.7	9.8	129.4	103.3	7.8	16.5
1954	60.6	22.5	279.5	177.0	7.8	45.0
1955	42.1	15.5	190.0	118.8	7.8	37.0
Total	138.6	53.2	728.3	502.4	31.2	107.0

[1] Southeast includes the entire states of Virginia, North Carolina, South Carolina, Georgia, and Florida.

[2] The data for 1952 were obtained from the "Timber Resources Review," and losses for that year were considered normal or near normal. Data for 1953-1955 show endemic plus epidemic mortality.

On private lands some beetle control is in progress, but there is a great deal of room for improvement. Fortunately, uncontrolled outbreaks are primarily in small tracts of forest land and do not endanger land under organized control. There is an appreciable amount of control going on in some private lands, particularly salvage in North Carolina as a result of efforts of forest industry and public agencies. Through lectures and news articles, landowners have been and are being advised of the problem, their trees are marked, and a market found for their wood.

Toward the end of the year another outbreak was discovered in Tennessee on the Tellico Ranger District, an area quite apart from other infestations. Control possibilities and the high value of timber justified a control project, much of which consists of salvage.

The reduction in the severity of the epidemic has been substantial since large-scale control programs began about a year ago. In a number of large control units, outbreaks have been wiped out or are negligible. In the Smoky Mountains National Park, for example, there were about 26,000 infested trees in March 1955; now there are about 3,000.

South Carolina.--In August some killing by the beetle was observed to be concentrated in Union County, extending into all counties surrounding it. The situation was so confused by mortality from Ips, littleleaf disease, drought, and just poor site conditions that no attempt was made to set up a control program. However, observation of the area was maintained to detect any unusual extension of the southern pine beetle in adjacent lands.

In October, outbreaks were spotted in Pickens County, particularly on the Sumter National Forest. Conditions justified a control program, which was set up as soon as possible. State and extension foresters were advised of conditions on private land and took action in the matter.

Georgia.--Toward the end of the year outbreaks were reported and confirmed from the counties of extreme north Georgia including the Chattahoochee National Forest. An aerial survey has been planned. A rather positive report was very recently received from LaGrange and confirmed; this may well be a fringe attack from the epidemic area around Talledega, Alabama.

Kentucky-Virginia.--Not a great deal is known regarding the status of the beetle in these two states except that it is more or less active. Aerial observation in Virginia in March 1955 revealed substantial killing in an area of about 700,000 acres in the central part of the State. An intensive aerial check in May defined the epidemic area; however, ground checks revealed very low beetle populations. Since then, scattered outbreaks have been reported, but these have not been severe. The Division is working very closely with the entomologist from the State Forester's office in following developments.

In Kentucky no great losses have taken place. However, the State Forester's office is very active in cleaning up outbreaks early in their development and recommending such activity to private owners.

General.--A study of southern pine beetle outbreaks in the Southeast to date shows that outbreaks become quite severe in the heart of the Southern Appalachians and decrease in their intensity at fringe areas of the mountains (figure 1).

Pine Engraver Beetle

Although the Ips beetles have caused much less region-wide damage this year than during the exceptionally dry 1954 season, it was estimated that 118.8 million board-feet and 190 thousand cords of southern yellow pine were killed in the Southeast by these bark beetles (table 1).

Most of the volume killed in 1955 occurred in southern Georgia and Florida, where soil and water-table moisture conditions were still subnormal. Large wildfires, intermittent summer cutting, lightning, and naval stores operations were contributing factors to small outbreaks in limited areas. In many localities, abnormally high engraver beetle populations were maintained in stands affected by persistent black turpentine beetle attacks. Rather serious losses also occurred in south-central North Carolina and north-central South Carolina.

Black Turpentine Beetle

The black turpentine beetle, Dendroctonus terebrans (Oliv.), was second only to the pine engravers in the total volume of pine killed by bark beetles in the Southeast during 1955. It was estimated that at least 37 million board-feet of sawtimber was killed in 1955, most of this in southern Georgia and northern Florida.

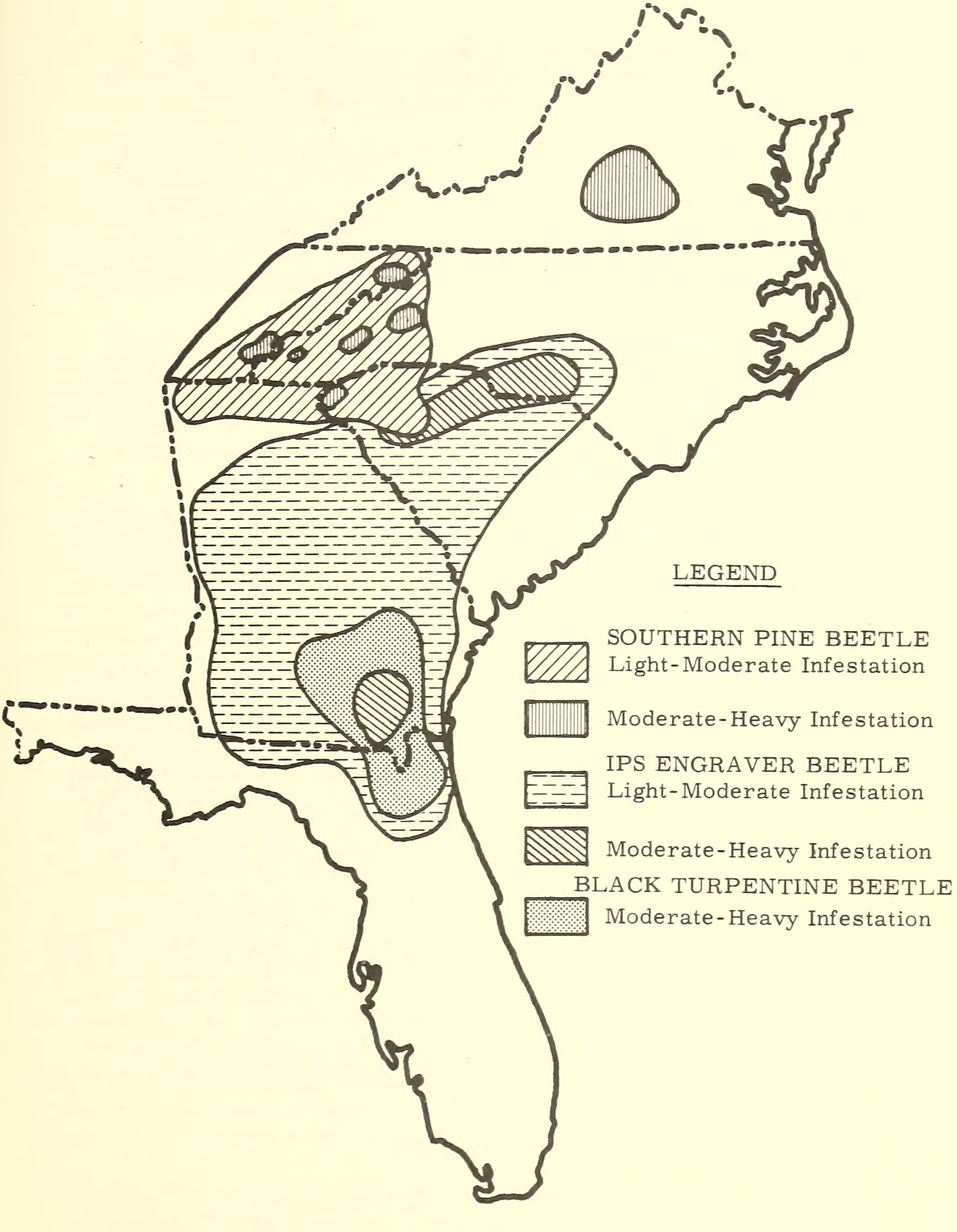
LEGEND
SOUTHERN PINE BEETLE
Light-Moderate Infestation
Moderate-Heavy Infestation
IPS ENGRAVER BEETLE
Light-Moderate Infestation
Moderate-Heavy Infestation
BLACK TURPENTINE BEETLE
Moderate-Heavy Infestation

Figure 1.--Major infestations of bark beetles in the Southeast during 1955.

The 1-percent gamma BHC fuel oil spray developed at the Lake City Research Center received wide use by turpentine operators in Georgia and Florida this year, and good results have been reported to date.

Despite the fact that most naval stores leases have been terminated on the Osceola National Forest, Florida, during the past few years because of heavy beetle-caused mortality in turpentine orchards, it was necessary to spray 6,000 non-faced, infested trees during the last half of 1955. Naval stores operations will be resumed in 1956 but limited to 1 crop (10,000 faced trees). This operation will be observed closely for black turpentine beetle attack in 1956.

This beetle has shown greater aggressiveness in the northern part of its range this year than during the past two seasons. In North Carolina, for example, an 18-year-old loblolly pine plantation in the north-central Piedmont was severely damaged, and heavy attacks are currently active on the Croatan National Forest. The beetle has been reported frequently from north Georgia, Tennessee, Kentucky, and Virginia.

In many instances the beetle has followed other forest depredations such as southern pine beetle or fire, which provide large amounts of breeding material. This is, of course, characteristic of the beetle's behavior.

Pine Reproduction Weevils

Three pine weevils, *Hylobius pales* (Hbst.), *Pachylobius picivorus* Germ., and *Pissodes nemorensis* Germ., particularly the first two, are increasingly damaging plantations, according to reports from every state in the Southeast. Damage consisting of adult feeding on stems of seedlings has varied from a negligible figure to 80-90 percent mortality. It has been most severe in plantings following cutting--a practice which is increasing. The beetles are also attracted to burns, and young pine in the vicinity may suffer injury or death. Pales and *Pachylobius* appear to be very closely associated; some reports indicate that the latter, a larger weevil, is more common and more destructive. *Pissodes nemorensis* is less frequently associated, but is not uncommon. Damage to young seedlings is usually fatal; seedlings 3 years and older generally survive except when attacked by *Pissodes*, which is capable of killing older reproduction, since its immature stages breed under the bark. Considerable research on control of these insects is in progress. Treatment of the plant by a dip in 2-percent aldrin or heptachlor emulsions is promising, as is the application of granular insecticides around the base of the seedling. Cutting and planting schedules are being studied as control techniques, since delayed planting is generally not practical.

Nantucket Pine Moth

This year, as in 1954, the pine moth, *Rhyacionia frustrana* (Comst.), has caused widespread damage to young pine in the Southeast. The Piedmont area of North Carolina, South Carolina, and Georgia has been particularly hard hit.

The effect of tip moth damage on pine is still questioned. Studies conducted by different researchers generally confirm the fact that infestation under average conditions causes 6 to 12 inches growth loss per year. A very heavy attack on a very poor growing site causes much more severe effects to the point of dwarfing.

General observations over the South during several years strongly indicate that generally the severity of infestation varies directly with the vigor of trees, as it is influenced by drought, site, and related environmental factors (size of insect populations, of course, plays a dominant part).

Success in control has been obtained experimentally and in practice by spraying with the chlorinated hydrocarbons such as DDT and benzene hexachloride. This may be impractical in large plantations or in plantings subject to contamination from adjacent untreated areas.

Four-eyed Spruce Bark Beetle

This bark beetle, *Polygraphus rufipennis* (Kirby), was found associated with the southern pine beetle in red spruce near Mt. Mitchell, North Carolina. Groups of spruce were attacked by the southern pine beetle, but the insect failed to develop broods; the four-eyed spruce beetle followed, developed normally, and aided in killing the tree. Large populations later developed which were capable of killing spruce without southern pine beetle association. Such outbreaks were local and shortlived.

Hickory Bark Beetle

During the severe drought year 1954, this bark beetle, *Scolytus quadrispinosus* Say., killed thousands of hickory trees over a 6-county area in the extreme southwest Piedmont Region of North Carolina. Because of the irregular distribution of hickories in forest stands and as shade trees, trees were seldom killed in large groups.

In 1955, mortality caused by this beetle was common but approached endemic levels. Dead and dying twigs and branches were frequently reported from this area as a result of the feeding of adult beetles.

Pith Boring Bark Beetle

Pityophthorus pulicarius (Zimm.), caused much concern again in 1955. At the Lake City, Florida, Research Center this small beetle attacked and killed valuable scions of grafted slash pine being prepared for seed-orchard establishment as part of the forest genetics project.

Pine Leaf Aphid

The pine leaf aphid, *Pineus pinifoliae* (Fitch.), is a sucking insect which causes dying of branch tips and sometimes death of suppressed seedlings of white pine; it has a complete life cycle on red spruce and white pine. During

May-June 1951, it caused serious damage in the mountains of western North Carolina. Occurring on white pine during odd-numbered years, the infestation expected in 1955 did not materialize.

Pine Pitch Moth

The larvae of a species of Dioryctria (possibly amatella) was found boring into freshly made wounds or small turpentine faces in experimental gum yield plots at Lake City, Florida. A 1-percent gamma BHC oil spray application appears to have prevented the moth from attacking fresh wounds for at least 3 months.

White Grubs

In 1954 considerable damage to recently planted pine seedlings caused by Phyllophaga spp. occurred in a tree-planting project on lands of the Atomic Energy Commission at Aiken, South Carolina. In 1955 damage was very light and population counts revealed light and erratic grub distribution. While the white grub problem is common in pine nurseries, to date it has been relatively uncommon in plantations. With increased planting of agricultural lands, however, the problem may well become more severe. Therefore, control of the insect is being studied, and certain synthetic organic insecticides appear promising.

Pine Sawflies

A few reports of very localized infestations of Neodiprion spp. were received from almost every state in the Southeast during 1955. The red-headed pine sawfly, Neodiprion lecontei, was most frequently reported on longleaf, slash, and loblolly pines. Due to recent clarifications in the taxonomic status of the genus Neodiprion, it is hoped that future sawfly damage will be more accurately reported as to species distribution and host plant preference.

Cypress Flea Beetle

During mid-June to late August 1954, feeding by the adult Systena marginalis (Illinger) caused severe discoloration of 80 to 90 percent of the cypress foliage over 14 counties in southeast Georgia and northeast Florida. What had been thought to be drought injury was actually insect feeding.

In 1955, observations revealed that the damage was approximately 50 percent less than in 1954 over the same area.

Records of the National Museum show that this species is widely distributed over the eastern United States from New Hampshire to Florida and Alabama. It has been reported as feeding on clover, peach, and fire cherry, in addition to cypress.

Although the effects of the beetle's feeding on cypress have not been investigated, it is suspected that the damage could have an adverse effect on growth and survival, particularly during drought or other severe environmental upsets.

Fall Cankerworm

Following 3 consecutive years of heavy hardwood defoliation throughout the Southern Appalachians, infestations of the fall cankerworm, Alsophila pometaria (Harr.), were reduced to small localized centers during 1955. Late spring freezes and moderate egg parasitization appears to have largely accounted for the natural control of the outbreak. It has been difficult to differentiate the limited tree mortality observed in fall cankerworm defoliated areas from severe drought. However, there have been claims of considerable tree mortality caused by this insect in West Virginia in 1955. In control studies, a 2.5 percent DDT spray applied to the trunk to prevent egg-laying appeared only partly successful. A DDT mist spray applied to the foliage to kill larvae appeared more effective.

Orange-striped Oakworm

The larvae of this moth, Anisota senatoria (Smith), were commonly found stripping individual trees and small scattered clumps of oaks throughout the Southern Appalachians in 1955 as in 1954. An unidentified virus or bacterial wilt disease appeared to be an effective natural control in many larval colonies this year.

Mimosa Webworm

Although not a forest pest, the larvae of this moth, Homadaula albizziae, Clarke, causes serious defoliation of ornamental mimosa trees. Increased observation of this damage during 1954 and 1955 indicate a strong movement into western North Carolina, where 3 to 4 years ago infestations were very light.

Agriculture--Asheville

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